

$^{86}\text{Kr}(t, ^3\text{He})$ 2019Ti09

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	A. Negret and B. Singh		NDS 203,283 (2025)	20-Jan-2025

2019Ti09: E(t)=115 MeV/nucleon produced from fragmentation of a primary ^{16}O beam at 150 MeV/nucleon on a ^9Be target, followed by extraction of ^3H ions using the A1900 fragment separator at the NSCL-MSU facility. Reaction target was ^{86}Kr gas at pressure of 1210 torr. Measured E_γ , angular distributions from 0° to 4° in the c.m. system, and $(^3\text{He})\gamma$ -coin using the GRETINA array of 36-fold segmented, 32 HPGe crystals, and the S800 spectrograph. FWHM ≈ 400 keV for particles. Deduced cross sections for population of states in ^{86}Br , ΔL values of transitions using multipole decomposition analysis (MDA), Gamow-Teller transition strength from ^{86}Kr to ^{86}Br , and stellar electron-capture rates based on the extracted B(GT) strengths. Comparison with shell-model and quasiparticle random-phase approximation (QRPA) calculations.

Gamow-Teller strength distributions extracted from this experiment up to 5-MeV excitation energy are shown in Fig. 5 of **2019Ti09**, with comparison to shell-model and QRPA calculations using NUSHELLX code.

 ^{86}Br Levels

E(level) [†]	J ^π	L [‡]	Comments
≈ 200	4^-	≥ 1	E(level): this level corresponds to the 130.89 in Adopted Levels. J ^π : 2019Ti09 took the assignment from 2016Ur04 . 77-keV γ associated with the excitation energy of ≈ 200 keV.
244.02?	4^-		E(level): from the Adopted Levels. J ^π : 2019Ti09 took the assignment from 2016Ur04 . A weak and uncertain 191-keV γ possibly associated with the excitation energy of 244 keV.
≈ 900	≥ 2		932-keV γ associated with the excitation energy of ≈ 900 keV.
≈ 1700	0,2		L: MDA for ≈ 1.7 MeV excitation associated with 1753 γ . 942-keV and 1753-keV γ rays associated with the excitation energy of ≈ 1700 keV. Deduced Gamow-Teller strength=0.045 +43–45 (2019Ti09).
≈ 2300	1		L: MDA for ≈ 2.3 MeV excitation associated with 1427 γ . 932-keV and 1427-keV γ rays associated with the excitation energy of ≈ 2300 keV. 2019Ti09 also considered the possibility that 2361 γ was associated with 2300 keV excitation, in view of large uncertainty of 300 keV for excitation energy. If all the three γ rays 932, 1427 and 2361 are associated with 2300 keV excitation, then this state is not 1^+ , as a Gamow-Teller transition.
≈ 2400	0,2		L: MDA for ≈ 2.4 MeV excitation associated with 2361 γ . 2361-keV γ associated with the excitation energy of ≈ 2400 keV. However, 2019Ti09 also considered the possibility that 2361 γ was associated with 2300 keV excitation, in view of large uncertainty of 300 keV for excitation energy. Deduced Gamow-Teller strength=0.063 +46–63 (2019Ti09).
≈ 2600	2^-	1	J ^π : from 2019Ti09 . 2016Ur04 assigned $1^-, 2$ for a 2551 level. 382-keV γ associated with the excitation energy of ≈ 2600 keV.
≈ 3100	2^-	≥ 1	J ^π : from 2019Ti09 . 2016Ur04 assigned $1^-, 2$ for a 2797 level. 207-keV γ associated with the excitation energy of ≈ 3100 keV.
≈ 3600	≥ 1		207-keV γ associated with the excitation energy of ≈ 3600 keV.

[†] Deduced by **2019Ti09** from a gate width of ≈ 1.5 MeV placed around each of the excitation energy peak in the excitation energy spectrum, with uncertainty stated by authors as ≈ 0.3 MeV.

[‡] From multipole decomposition analysis (MDA) of angular distribution data for excited states up to 5 MeV excitation energy (shown in Fig. 4 of **2019Ti09**) associated with relevant γ -ray peaks, and the use of DWBA code FOLD. All the values are listed as tentative by **2019Ti09**.

$^{86}\text{Kr}(\text{t}, ^3\text{He}\gamma)$ **2019Ti09** (continued) $\gamma(^{86}\text{Br})$

E_γ [†]	<u>$E_i(\text{level})$</u>	Comments
^x 77		This γ associated with the excitation energy of ≈ 200 keV.
^x 191		A weak and uncertain γ possibly associated with the excitation energy of a known level at 244 keV.
^x 207		Doublet, the γ rays associated with the excitation energies of ≈ 3100 keV and ≈ 3600 keV.
^x 382		This γ associated with the excitation energy of ≈ 2600 keV.
^x 932		Doublet, the γ rays associated with the excitation energies of ≈ 900 keV and ≈ 2300 keV.
^x 942		This γ associated with the excitation energy of ≈ 1700 keV.
^x 1427		This γ associated with the excitation energy of ≈ 2300 keV.
^x 1753		This γ associated with the excitation energy of ≈ 1700 keV.
^x 2361		This γ associated with the excitation energy of ≈ 2300 and/or ≈ 2400 keV excitation.

[†] Deduced by **2019Ti09** with a gate width of ≈ 5 keV placed around each γ -ray peak in the γ spectrum.

^x γ ray not placed in level scheme.